

Tunis, north of the Sahara, and the intermediate islands; also Tripoli, Egypt, North-west Arabia, and Abyssinia.

D. Var. *vittatus*.

30-34 scales round the body (usually 32). Bronzy brown above, without ocelli; a light upper and a black lower lateral band. From snout to vent 115 millim.

Only known from Tangiers, where no other form occurs.

E. Var. *polylepis*.

34-40 scales round the body (usually 36-38). Dark brown above, usually with a small round yellowish spot on each scale; sides of neck with vertical black and white bars, which disappear in the adult. From snout to vent 150 millim.

Morocco. First noticed by Boettger from Casablanca, Mogador, and the city of Morocco. Nine specimens from the city of Morocco and four from Casablanca are now in the Natural-History Museum.

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LVII.—On a new American *Species* of the remarkable animal *Phoronis*. By E. A. ANDREWS, Ph.D., Johns Hopkins University, Baltimore, U. S. A.

*Phoronis architecta*, sp. n.

The following manifestly imperfect notice of an American form of the interesting genus *Phoronis* is published with the desire of calling the attention of embryologists to its existence in the hope that it may thus be the sooner known and perhaps included in a needed monograph of the group rather than from any desire of adding a new species to the present list of five or six, some of which are also insufficiently described.

The animal was found at Beaufort, N. C., in June 1885, inhabiting slender tubes standing upright in rather impure or muddy sand, both immediately in front of the building then occupied by the Chesapeake Laboratory and also upon "Shark Shoal."

The tubes are isolated and separate, each a clear, firm, chitin-like membrane passing down many inches into the sand and slightly projecting above its surface in regions laid bare at low water. The upper part of this tube is covered with a layer of sand, which seems as if selected, being composed of rounded grains of clear silex with a few of milky quartz, and no dark grains at all.

The animal fits tightly in the tube and cannot be easily removed; its length (in imperfect specimens) is about 50

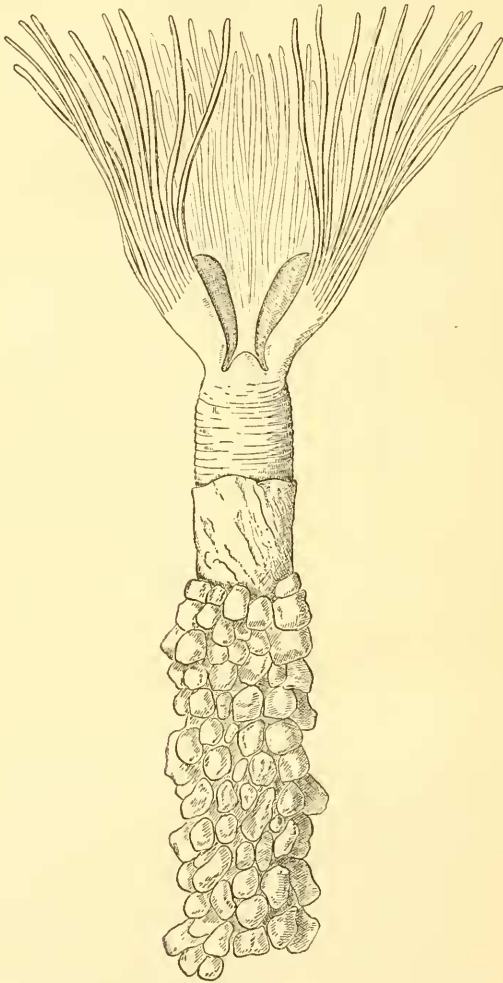


Fig. 1.—View of tube and branchial end of animal. The sand is removed from part of the tube, from which the animal projects. The branchiæ are artificially separated, to show the two large spoon-shaped organs and the papilla bearing the anal and nephridial openings. Camera drawing, Zeiss 4 a. *The branchiæ should be much shorter on the abanal or oral aspect!*

millim. and greatest diameter about 1 millim., while the branchiæ have a length of perhaps  $1\frac{1}{2}$  millim.

The tentacles are about sixty and arranged in a simple

erescant, as in *P. Kowalevskii*, Cald., with which this species has close affinities, rather than with *P. australis*, Hasw., or *P. Buskii*, M'Int.

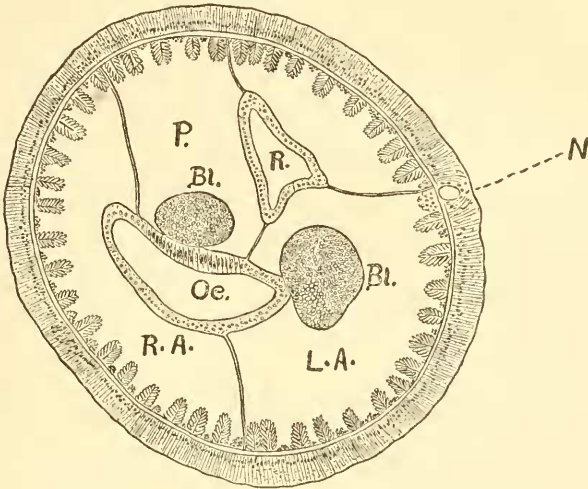


Fig. 2.—Transverse section of anterior region; the body-wall composed of a thick epidermis, a supporting layer, longitudinal muscles in definite pinnate ridges. In it is the left nerve-rod, N. R=rectum or intestine; Oe=oesophagus with special ridge next the blood-vessel (Bl) in the posterior cavity (P); R. A. and L. A.=right and left chambers of the body-cavity. Camera, Zeiss 5 A.

The marked peculiarity of the lophophore is the presence,

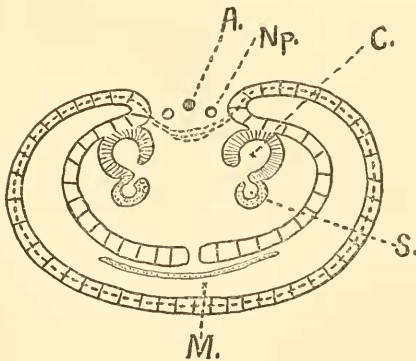


Fig. 3.—Diagram of section of base of lophophore on to which are projected sections of the carpel-like organ (C), the sense-lobe (S), and the anal and nephridial openings (A and Np). The mouth (M) is provided with a transverse epistomial membrane. The nerve-ring is indicated by a circumoral dotted line.

at each end of the crescentic base, of a large carpel-like or spoon-shaped organ, opening by a wide longitudinal slit into the extra-branchial or anal space, but facing towards the mouth (from which these organs are separated by the row of branchiæ between mouth and anus). The cavities of these organs are ciliated and lined by a peculiar glandular epithelium. At the base of each is situated a spherical "sense-lobe," apparently corresponding to the "glandular pit" of *P. Kowalevskii* as described by Benham, and having its ciliated cavity opening in common with the basal part of the slit in the above carpel organ. The function of this large carpel-shaped organ is unknown, but may be supposed to have some connexion with the tube-building habit, possibly as an organ for collecting or fixing sand-grains to the secreted chitin-like tube.

The body-wall presents in close contact with the inner aspect of its well-developed "supporting-tissue" layer transverse fibres (apparently muscular), internal to which is a very well-marked system of longitudinal muscles. Anteriorly these muscles form conspicuous ridges, a section of one of which shows the fibres to be arranged in a markedly pinnate group (each fibre is cylindrical, with abruptly pointed ends).

The branchiæ are ciliated on the lateral sides as well as on the oral side, and in the latter aspect have numerous unicellular glands, which continue down in the walls of what may be distinguished as the pharyngeal part of the digestive tube. The œsophagus and first stomach are characterized by the possession of a definite longitudinal ridge of ciliated gland-cells, which in the stomach forms a groove similar to, if not homologous with, the ciliated groove in the sipunculus. The position of this ridge is such as to lie close to the large blood-vessel (afferent vessel of Caldwell) and facing the posterior division of the body-cavity.

In the first stomach a peculiar process of intracellular digestion takes place, irregular ridges of epithelium rising up around one or more large diatoms, and enclosing them in vacuoles within a syncytium-like multinucleated protoplasmic mass.

The epithelium of the second stomach is histologically different from that of the first. The intestine contains balls or cylinders of broken diatom-shells.

In one apparently perfect specimen sections show only spermatozoa in various stages of formation, while fragments of other individuals contain eggs in process of formation. As far as can be told from the imperfect material at hand this species of *Phoronis* is not hermaphrodite, or at least the two

sexual products may not develop simultaneously in one individual.

There is a very large "nerve-rod" on the left side, which is a clear solid structure surrounded by the epidermal cells and having a finely fibrillated or perhaps only coagulated structure. This rod extends through a considerable part of the length of the animal and ends in the peculiar ring of epidermal nerve-substance surrounding the mouth and especially well developed near the anus. At this point there are two symmetrically placed and closely approximated nerve-rods, of which, however, only the left one could be traced. The right rod appears not to extend far and to be atrophied as compared with the condition in *P. australis*.

Blood-vessels, septa, supporting framework, and nephridia seem essentially like those of *P. australis* as far as was determined.

In live specimens the flow of blood in the branchiæ, the contraction of the vessels and the cilia in the anterior region of the trunk were observed.

The *Actinotrocha* taken at Beaufort resemble the "species B" described by Wilson from the Chesapeake Bay.

The distinctive characters of *P. architecta* are thus:—The formation of isolated tubes covered by definite collections of sand-grains; the presence of special prostomial organs, possibly of use in formation of these tubes; the great development of the longitudinal muscles; the presence of a ciliated groove in the digestive tract; the apparent separation of the sexes.

As far as observed the characters of this species favour a nearer approach to the Sipunculid, and thence to the Annelid type, rather than to the Polyzoa on the other hand.

Baltimore,  
April 19, 1890.

### LVIII.—Descriptions of three new Species of Lycænidæ.

By Colonel C. SWINHOE, F.L.S., F.Z.S., &c.

#### Lycænidæ.

##### 1. *Arhopala viridissima*, n. sp.

♂. Upperside: fore wing glistening metallic green, veins, costal line, and outer marginal band black, the latter commencing very finely at the apex and gradually broadening on

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